

# **USING 3-DIMENSIONAL VELOCITY MODELS AND REFERENCE SEISMIC EVENTS TO IMPROVE SEISMIC LOCATIONS IN THE MEDITERRANEAN, NORTH AFRICA, MIDDLE EAST AND WESTERN EURASIA**

Joydeep Bhattacharyya (1), Istvan Bondar (1), Hans Israelsson (1), Keith McLaughlin (1), Robert North (1) and Xiaoping Yang (1)  
(1) SAIC, 1300 N. 17<sup>th</sup> Street, Suite 1450, Arlington, VA 22209, USA  
[scatter@cmr.gov](mailto:scatter@cmr.gov); (703) 247-4135

Improvements both in location and accuracy of seismic events are crucial for monitoring the Comprehensive Nuclear-Test-Ban Treaty. Smaller events ( $M < 4$ ), located by only a few International Monitoring System (IMS) stations at regional distances, could substantially be mislocated. It has been demonstrated that path and phase dependent station corrections are capable of improving event locations and reduce uncertainties. Accurate prediction of seismic travel times is essential in computing these corrections and is largely dependent on our understanding of the crust and mantle velocity structure. In this study, we implement a recently developed technique to compute seismic travel times to seismic stations in the Mediterranean, North Africa, Middle East and Western Eurasia region. By using 3-D velocity models in lieu of more commonly used 1-D radial models, we expect to improve the traveltimes predictions of regional seismic phases in this region. We use a composite global 3-D model using information taken from published empirical models. We compute travel times through this integrated model and traveltimes corrections with respect to those predicted for a reference global model, IASP91, is presented. The correction surfaces are computed out to 20° from the stations. We show examples for stations in the region.

A consortium of scientific institutes (SAIC, University of Colorado, Harvard University, University of California San Diego, Multimax and Geophysical Institute of Israel) was formed to construct path dependent corrections for regional phases Pn, Pg, Sn and Lg recorded at IMS stations in the Mediterranean, North Africa, Middle East and Western Eurasia region. To derive and validate models and corrections, reference events located with 5km accuracy or better are needed. Moreover, using event clusters let us more tightly constrain the seismic structure in specific regions. The consortium has launched a major effort to collect and validate reference events in the region. Interested researchers are invited to contribute to the project. The collected reference events will be publicly available on the consortium's home page at <http://g2calibration.cmr.gov>.